

Role of Business Intelligence in Banking Sector for Achieving Competitive Advantage- An Empirical Analysis

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ABSTRACT:

With recent advancements in information technology, organizations' capability to acquire and analyze data for efficient decision making has increased. Good strategies promote alignment among processes and technology in use, which may result in better firm performance. However, there has been little focus on how firm strategies and business intelligence (BI) systems might play their part in forming organizational information and getting a competitive edge. Therefore, the purpose of conducting this study is to investigate the impact of firm strategy on firm competitive advantage with mediating role of BI adoption and moderating role of BI capabilities. For this, a quantitative research methodology was used, and data was collected from 300 middle-level managers in Pakistan's telecom sector. Statistical tests such as descriptive statistics, correlation, reliability analysis, one-way ANOVA, confirmatory factor analysis, and mediation analysis through Hayes process were performed using SPSS and AMOS. The findings revealed a positive link between firm strategy and competitive advantage, with business intelligence adoption serving as a mediating factor. Business intelligence capabilities positively moderate the relationship between BI adoption and competitive advantage. Hence, all proposed hypotheses (H1, H2, and H3) were approved. The contribution and Limitation of the study are also discussed.

JEL Classification: G2, G20, G21

Keywords: Business Intelligence, Firm Strategy, Technology adoption, competitive advantage,

INTRODUCTION

With the emergence of new technologies and the commencement of the era of digitization, organizations are embracing new ways to organize the data (Sivarajah, Kamal, Irani & Weerakkody, 2017), which may be available in the form of customer data, inventory information, logistics data, and social media data. Organizations not only collect it but arrange it in such a way that the company can understand and utilize it. For example, banks invest in BI Systems to conjoint data from different departments; so that they can be accessed and applied whenever needed (Ubiparipović & Đurković, 2011). Customer Relationship Management department handles matters such as customer investment profile, customer complaint, etc; the analysis of interest rate risk is done under risk management. Compliance sees issues regarding monetary capital adequacy and the structure of regulatory capital, etc.; performance management

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handgrips issues regarding customer effectiveness, transaction analysis, productivity analysis etc., asset and liability management deals regarding liquidity analysis, income evaluation, etc. (Oliveira & Martins, 2010). Studies reported that in the absence of appropriate technology/information systems, organizations fail to utilize the information they collected, which in turn affected their decision-making abilities. So, the organization has to adopt new technologies and tools to gather and manage data to quicken their performance and attain competitive advantage (Işık & Sidorova, 2013). Concerning this, Business Intelligence (BI) is considered as an overarching framework comprising information technologies and processes to improve the decision-making process (Wanda & Stian, 2015). Nowadays, businesses collect large quantities of information from various sources and use Business Intelligence to gather, consolidate and analyze information that can add prodigious worth to a business. BI can also provide the right time data for executives and make them able to make informed decisions to put them up front with their opponents (Viaene et al., 2009). Business intelligence systems are solely responsible for creating effective knowledge and information to help decision-makers and strategic leaders in their tasks (Olszak & Ziemba, 2004). Lately, organizations have begun looking for new tools that help to analyze large amounts of data from different resources (Olszak & Ziemba, 2007); and for achieving this goal, strategies are proposed and implemented. The firm strategy combines both human and technical components of the organization (Avgerou & McGrath 2007) that help firm in gaining competitive advantage and better positioning.

According to Kunle, Akanbi and Ismail (2017), the competitive advantage of companies refers to the capability of firms to accelerate in terms of productivity, or profits as compared to competitors within the same industry. Companies need good competitive intelligence to gather knowledge about their workplace environment in today's highly competitive market environment. Hwang and Seruga (2011) reinforces that firms can boost their abilities like process improvement, cross-functional coordination, information access, innovativeness, flexibility, and agility by using information technology. Hence, after the successful deployment of Business Intelligence and appropriate strategy, firms can boost their capabilities and achieve a competitive advantage. It was also said that BI adoption is a key parameter for determining the impact of BI. Studies on the effects of Business Intelligence Adoption (BIA) on banks are uncommon, and none have been conducted in Pakistan. As a result, it would be reasonable to include Business Intelligence Adoption as a key metric for assessing the impact of BI on bank performance (Nithya & Kiruthika, 2021).

Resource-based view theory in 1991 was proposed by Barney, insinuated that a firm's competitive advantage lies chiefly in the solicitation of things, in short means that are valued, rare, unique, and non-substitutable. Moreover, the theory states that a firm can accomplish a competitive advantage via tangible or intangible resources. These resources could be raw material, people, abilities, experiences, and know-how of the people and the information they retain, and ultimately this helps in building firm performance better. Firms having such resources can achieve a competitive advantage and perform effectively. Yet another key assumption of Resource-based theory is Capabilities. Now the important thing is there is a clear difference between capabilities and resources where resources refer to the ownership of organizations and capabilities refer to the extent to which an organization can do something. Capabilities incline to ascend over time as the firm yields actions that build on its strategic resources that top to firm performance. Industry practitioners have turned to BI solutions to produce better goods and services with enhanced processes and management practices in order to compete in traditional

marketplaces or internet commerce (Ahmad, Miskon, Alabdan & Tillil, 2020). Deploying resource-based view theory; the current study illustrates that firm resources (strategy) may help in improving firm practices and enhancing firm's capabilities that ultimately lead to firm competitive advantage. Hence the foremost objective of conducting this study is "to investigate how and why firm strategy influence firm competitive advantage"

LITERATURE REVIEW

Firm Strategy, Business Intelligence, and Competitive advantage:

A resource is considered significant if it assists a firm in developing a system that gains by promising circumstances and avoids dangers. An essential resource is a resource that is significant, uncommon, hard to mirror and no substitutable. Like: The IT/IS resources of a firm are made out of substantial resources, for example, hardware and software human resources (IT/IS employees that executes their abilities and obligation to their positions, and elusive resources), corporate culture, IT/IS managerial abilities, experience and capabilities (Hunger, Wheelen, Hunger, Hoffman & Bamford, 2017). Hence, in the light of information system (IS) investment; firm strategy characterized IS as an asset, alluding to physical, human, and authoritative capital assets, separately (Wheelen et al., 2017). This origination of firm strategy considers IT as an item or a source for gaining a competitive advantage. According to Ramanathan, Philpott, Duan and Cao (2017), business intelligence is the method of transforming raw data into usable knowledge to bring up more strategic and organizational visions for enhancing decision-making capabilities. This helps in the refinement of more enhanced results and improve the decisions taken by the organizations. Loshin (2012) considers the term business intelligence to be a collection of technical resources and processes that aid in the conversion of data into information and knowledge. According to Balachandran and Prasad (2017), business intelligence reflects to tools, applications, and activities for gathering, analyzing, integrating, and presenting business data to adhere to better and quicker business decisions. This is in accordance with the reports and goals of assisting consumers in making decisions in the sense of business intelligence. Data that the data management involves removing information from different inward and outside operating systems and setting it up to meet the necessities for changing it to information, which incorporates information quality, especially on account of enormous data collections.

Like Business Intelligence (BI) systems are commonly believed to be software programs that provide decision-makers with information to maintain business efficiency. It is a holistic term that involves gathering, incorporating, evaluating, and visualizing organizational data to help and develop organizational data. BI's benefits are largely tacit that complements to fact-based decision-making and increases the attribute of results (Fink, Yogev & Even, 2017). Such improved decisions based on quality data results in enhancing business efficiency, productivity, and effectiveness. BI impacts the banking sector's decision-making process, according to many review studies on BI and decision-making. This demonstrates that BI deployment in banks will almost certainly result in a major improvement in the overall efficiency of bank operations. Despite the fact that several studies have characterized BI as a decision-making tool, there is yet to be a research that measures the impact of BI on bank performance (Nithya & Kiruthika, 2021).

When combining and analyzing data from several sources, data quality is critical to the business intelligence system. The quality of data representation, interpretation, and understanding

influences the accuracy of data representation, interpretation, and understanding in order to make the decision-making process more efficient (Richards, Yeoh, Chong & Popovič, 2019). Business intelligence will be useless if this does not happen (Mashingaidze & Backhouse 2017). Many issues with back-end systems aren't discovered until after the data has been loaded into a business intelligence system. Other times, the data may be reliable at the source level, but the format prevents it from being used for other data sources. As a result, common standards and definitions (standardization) are required to enable the use of data from various operations. Although many organizations flourish from advanced information technology and use it to improve decision-making and productivity; the real effect of BI systems on companies' operating success in a rapidly evolving, the competitive world is largely unexplored (Trieu, 2017). Based on the above arguments and to fill the said gap; the current study proposes the following two hypotheses:

H1: Firm Strategy has a positive impact on firm competitive advantage.

H2: Business intelligence adoption mediates the relationship between firm strategy and firm competitive advantage.

The moderating role of Business Intelligence Capabilities:

New business opportunities are revealed when firms perform and show their capabilities by extracting information from the environment to revolutionize (Wang & Dass, 2017). According to Clark, Jones and Armstrong (2007), business intelligence (BI) is an information system that collects and filters mostly data to transform them into enterprise-related knowledge and information in order to predict the pattern and reduce uncertainty during decision-making. Davenport (2010) argues that BI is a subsystem for the generation of operational statistics (OLAP) online, on-line analyses and retrieval and conversion, and operational analyses (BI) (Henschen, 2010). BI offers solutions to business issues and issues related to data gathering and handling using the two main functions of data filtration and information generation to reduce cognition challenges. The various explanations and interpretations show that the basic characteristics of a BI system are based on data search, extraction, discerning and discovery capabilities (Foley & Guillemette, 2010). This obtained information helps managers to find out novel business prospects (Ashrafi & Ravasan 2018; Sivarajah, Kamal, Irani & Weerakkody 2017). Hence, firms keep on developing innovative/revolutionizing competence through enterprise applications and firms who have innovation capacity get greater knowledge of the market; making it defiant for other competitors to match or replicate.

BI depends on the capability to find/search (collect), distinguish (analyze) and change (transform) data to locate possibilities and problems in market practices. BI capabilities can rapidly configure market processes to help optimize resources by identifying evolving situations promptly and accurately, meaning that it represents a capacity to understand and recognize possibilities that are compatible with the cognitive vision and search ability models. Such capabilities are important for companies to succeed in intensely competitive and dynamic market conditions. Likewise, Işık and Sidorova (2013), indicated that firms trust heavily in BI capabilities for discovering new opportunities and to make more entrepreneurial decisions. The proper use of BI capabilities aids firms to deploy new knowledge and visions for businesses (Sivarajah et al., 2017). Without having sufficient BI capabilities, firms may lack in their being able to be competitively matched with their opponents; and by not taking or adopting the compulsory decisions on required time. Thus, BI capabilities enhance the efficiency of

managers in deciding to unlock their firm goals and gain a competitive advantage (Wang & Dass, 2017). Hence, constructed on the above stated arguments, the following hypothesis is proposed:

H3: Business Intelligence capabilities moderates the relationship between BI adoption and firm competitive advantage such that the relationship strengthens when BI capabilities are high.

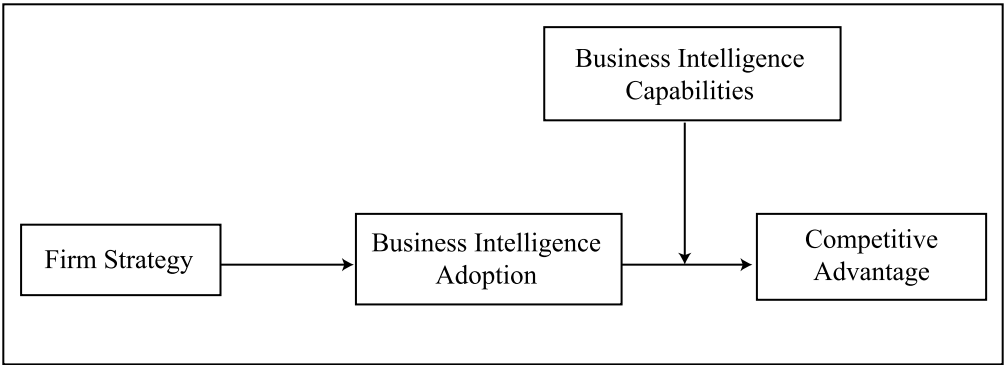


Figure 1: Research Model

METHOD

Sample and Data collection

Data was collected using a survey method from middle line managers of banks of Islamabad/ Rawalpindi (Pakistan) to respond for Firm Strategy, Business Intelligence (BI) adoption, BI capabilities, and Competitive advantage. A questionnaire was circulated, and the respondents were guaranteed that their responses would be kept secret. Approximately 380 questionnaires were circulated at time period 1, out of which 360 were received in a usable form, making a response rate of about 92.8% at time 1. Keeping a gap of around two weeks, the questionnaire for time two were distributed. Approximately received responses were 320, in an entirely usable form with a response ratio of about 80.4%. The third part of the questionnaires was distributed to the same respondents with the time-lag of two weeks, out of which 300 were received in an entirely operating form, 76.8% of the total response ratio. Hence final responses that were used to conduct statistical analysis were 300.

Measure:

Firm Strategy:

The study adapted 3 item scale developed by Chen, Mocker, Preston and Teubner (2010) for firm strategy. Sample item includes: “Our organization follows a safe and stable approach to developing new IS initiatives.” “Our organization adopts promising IS innovations once these initiatives have been proven in our industry.” BI adoption: The study adapted 11 item scale being developed by Gold, Malhotra and Segars (2001) for BI adoption and sample items includes “My firm has clear rules for formatting or categorizing process knowledge”, “My firm uses BI technology that allows it to monitor its competition and business partners.” Competitive Advantage: The study adapted 4 item scale developed by Tippins and Sohi (2003) for competitive advantage and sample items include “Customer satisfaction of our company

is better than that of key competitors” “Quality development of our company is better than that of key competitors” BI Capabilities: The study adapted 8 item scale developed by Wieder, Ossimitz and Chamoni (2012); Wixom and Watson (2001) and sample items include “encourages standardization of our BI development process” “Allocates sufficient resources to BI” The scales were measured using 5-point Likert scale oscillating from 1=strongly disagree to 5= strongly agree.

RESULTS

Demographic Statistic

The demographic statistics of the respondents are shown in the table: 1.

Table 1:
Demographic Statistics

Demographics	
Gender	
Male	82%
Female	18%
Age group	
20-30	51%
31-40	37%
41-45	9%
50<	4%
Educational level	
Graduate	49%
Masters	39%
M. Phil	8%
Others	4%
Specialization	
Management Sciences	31%
Computer Sciences	45%
Telecom Management	19%
Software Engineering	5%

Confirmatory Factor Analysis

“Confirmatory factor analysis” was executed using AMOS to examine the discriminant validity of the variables of this research. One on one pairing of constructs was checked aligned with their respective one-factor model (Anderson & Gerbing, 1988). Therefore, we first tested a full measurement model (i.e., four-factor model); and matched it with its respective one-factor model. Moreover, those variables that were measured at a one period of time from the same respondents were tested against their one-factor models. The results revealed higher fit

with four factor and two factor model as compared to their respective single-factor models, confirming discriminant validity of variables of current research. The outcomes of the CFA are exhibited in table 2.

Table 2:
Confirmatory Factor Analyses

Model	χ^2	CFI	GFI	AGFI	NFI	RAMSEA
MO: Four factor model (FS,BIA,BIC,-CA)	4908.987	.906	.79	.78	.77	.05
M1:one factor model (FS,BIA,BIC,CA)	7895.763	.805	.624	.598	.809	.07
Time 2						
M2: Two factor model (BIA,BIC)	255.254	.944	.975	.876	.865	.073
M3: One factor model (BIC and BIA)	443.743	.554	.754	.480	.543	.156

Note : n= 300, FS=Firm Strategy; BIA= Business intelligence adoption; BIC= and business intelligence capabilities, CA= Competitive advantage

Descriptive statistics, Correlations, and Reliability of the Main Variables

Table 3 gives the mean, standard deviation and correlation among the variables of the study. The means calculated for the study variables are: “Firm strategies” (M = 3.29, S.D = .818), “Business intelligence adoption” (M = 3.20, S.D = .865), “Business intelligence capabilities” (M =3.291, S.D =1.088), “Competitive advantage” (M = 3.2411, S.D =1.020). Correlation analysis was piloted to report the association between the variables. The correlation existing between independent variables (Firm strategies), mediators (Business intelligence adoption), moderator variable (Business intelligence capabilities), and dependent variable (Competitive advantage) depict that all study variables are significantly associated with each other. Like: Firm strategy is significantly associated to Business intelligence adoption($r = 0.534$, $p < 0.001$), Business intelligence capabilities ($r = 0.537$, $p < 0.001$), Competitive advantage ($r = 0.423$, $p < 0.001$). Business intelligence adoption is significantly associated to Business intelligence capabilities ($r =0.569$, $p < 0.001$), Competitive advantage ($r =0.597$, $p < 0.001$). Business intelligence capabilities is significantly correlated with Competitive advantage ($r =0.654$, $p < 0.001$).

Table 3:
Means, Standard deviations, Correlations, and Reliabilities

	Mean	SD	FS	BIA	BIC	CA
FS	3.2956	.81880	(.910)			
BIA	3.2072	.86566	.534**	(.921)		
BIC	3.2911	1.0886	.537**	.569**	(.920)	
CA	3.2411	1.0207	.423**	.597*	.654**	(.932)

Note : n= 300, FS= Firm Strategy; BIA= Business intelligence adoption; BIC= and business intelligence capabilities, CA= Competitive advantage. The Control Variable is gender: One dummy variable was made to control the effects of age, gender, degree specialization. Cronbach's alpha reliabilities are presented in parentheses. * $p < .05$, ** $p < .01$, *** $p < .001$.

Mediation Analysis

Haye's (2017) process technique utilizing a bootstrapping approach with Model 4 was used to test the mediation effects. Hypothesis H1 illustrates that Firm strategies is positively

related competitive advantage, and H2 contend that Business intelligence adoption mediates the relationship between and discontinuous usage intention was fully supported. Table 4 demonstrates that business intelligence adoption mediates the relationship between Firm strategies and competitive advantage: CI (0.0724, 0.2662). According to the estimations, no opposite sign was found between LLCI and ULCI; and as there was no zero between the upper and lower limit, mediation is approved.

Table 4:
Mediated Regression Analysis Results

Variable		β	SE	T	P
1	FS on BIA	0.5271	0.0503	9.482	0.0000
2	BIA on CA	0.1819	0.0725	2.5078	0.0000
3	Total Effect of FS on CA	0.0725	2.5078	0.127	0.0000
Bootstrap Results for Indirect Effects					
		Effect	SE	LL95% CI	UL 95% CI
FS>BIA>CA		0.1627	0.0490	0.0724	0.2662

Note: n= 300, Control Variables are Age, Gender, degree specialization. FS= Firm Strategy; BIA= Business intelligence adoption; BIC= and business intelligence capabilities, CA= Competitive advantage.Control, Bootstrap Sample Size=5000. LL=Lower Limit, CI= Confidence Interval, UL= Upper Limit

Table 5:
Hierarchical Moderated Regression Analysis

Predictors	BIC as a moderator between BIA and CA			
	Estimate	SE	T	P
Step 1				
Constant	3.58***	.45	8.07	.00
BIA	-.25***	.16	-.75	.08
BIC	-.28	.12	-2.33	.03
Step 2				
BIA x BIC	.19*	.05	4.38	.00

Conditional Direct Effects of X on Y at Values of Moderator (i.e., BIC) (Slope Test Results)

Moderator	BIC			
DTP	Effect	Boot SE	LLCI	ULCI
MOD -1SD (-1.08)	.14***	.08	.00	.28
MOD mean(0.00)	.33***	.06	.24	.43
MOD +1SD (1.08)	.53***	.07	.38	.66

*Note : n= 300, FS= Firm stratégies ; BIA= Business intelligence adoption ; BIC= and business intelligence capabilities, CA= Competitive advantage. Control Variable is gender. One dummy variable was made to control the effects of age, gender, degree specialization, Cronbach's alpha reliabilities are presented in parentheses. Bootstrap Sample Size=5000. LL=Lower Limit, CI= Confidence Interval, UL= Upper Limit. *p<.05, **p<.01, ***p<.001*

Moderation Regression Analysis

Table 5 shows moderation results of business intelligence capabilities between business intelligence adoption and competitive advantage as significant ($\beta = 0.19, t = 4.38, p < 0.000$), supporting hypothesis H3. The two-tailed significance test also confirmed these results (Effect = 0.14, Boot SE = 0.08, $p < 0.00$); moreover, the bootstrapping technique at 95%CI also verified these results by the non-zero values held between the lower limit and upper limit [0.00, 0.28].

To further clarify business intelligence capabilities moderation effect, the graph is plotted, as shown in figure 2. By going through interaction plot the value at high business intelligence capabilities depicts ($B = 0.08, P < 0.12$) and value at low business intelligence capabilities depicts ($B = 0.07, P < 0.00$). So our proposed hypothesis is proved, which depicts that the positive association among business intelligence adoption and competitive advantage is stronger when business intelligence capabilities is high.

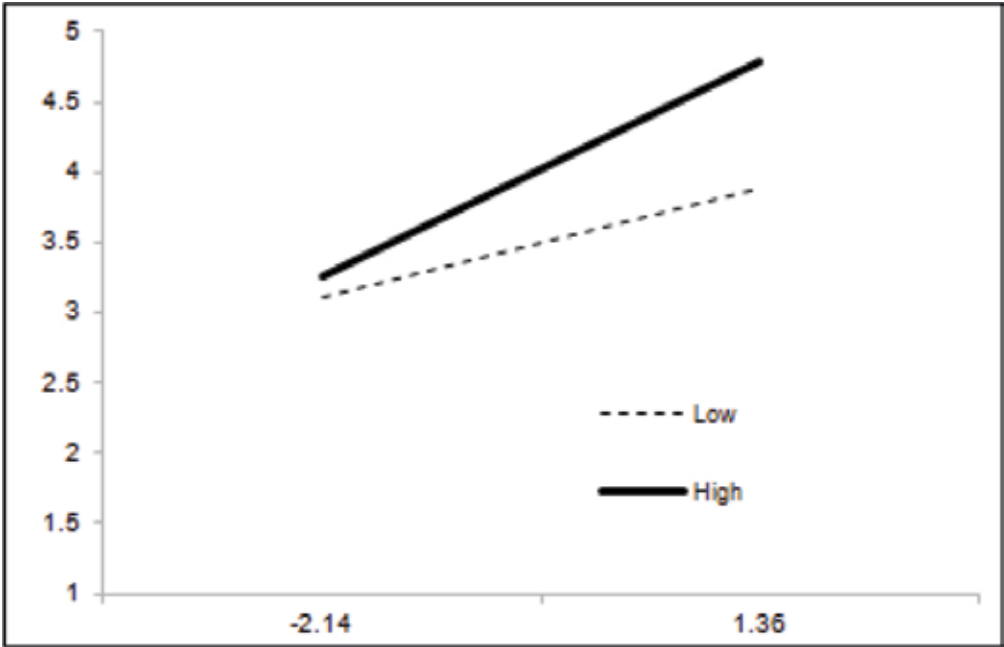


Figure 2: *Interaction effects of BIA and BIC on CA*

DISCUSSION

In general data and information generated in the firm are increasing regularly; making firms rely on information systems to assemble and formulate it for decision making. With the expansion of computer intelligence and the advent of the term Big data; Business intelligence and analytics (BI&A) has become the buzz work; and area of great interest to academicians and practitioners. However, McKinsey Global Institute reported a scarcity of research in investigating the potential of big data. The report also highlights challenges that firms face in gaining reward after deploying BI that includes: strategy, IT infrastructure, leadership (Suoniemi et al., 2020). Hence for a firm to make IT investment and to get the best out of it; in time strategy development and implementation is needed; that may result in better firm performance. Therefore, by deploying resource-based view theory; this study addresses the

role of firm strategy in adopting business intelligence; which in turn leads to firm competitive advantage. Moreover, the study also makes a major contribution in explaining the moderating role of BI capabilities in gaining firm competitive advantage.

In the light of the data collected and the result computed; this research investigated the role of firm strategy, business intelligence adoption on the competitive advantage of the firm by exploiting BI capabilities. For this Hayes (2017), process technique utilizing a bootstrapping approach with Model 1 and 4 was used to test the mediation and moderation. Results revealed that Firm strategies is positively related to business intelligence adoption, ($B=0.5271$, $t=9.482$, $**p<0.0000$). Business intelligence adoption has positive impact on competitive advantage ($B=0.1819$, $t=2.5078$, $**p<0.0000$). Bootstraps results revealed that business intelligence adoption mediates the relationship between Firm strategies and competitive advantage ($B=0.1627$) with 95% CI (0.0724, 0.2662, and if there is no opposite sign, mediation is approved as suggested by Hayes (2017). Furthermore, full statistical provision was found for the moderating role of business intelligence capabilities between business intelligence adoption and competitive advantage, such that the relationship strengthened when business intelligence capabilities are high. Hence, all the proposed hypotheses H1, H2, and H3 were approved.

Contribution of the study

A vital issue of this line of examination is that the idea of IS system is to a great extent disregarded. The absence of a distinctly demarcated strategy concept may clarify why there has been a conflicting comprehension of how to evaluate the procedures and conclusions, or “means” and “ends” of strategy planning. Firms today experience more prominent rivalry and dynamism in the commercial center because of globalization and continuous Technology advancements. Keeping an edge over the competition it expects firms to innovate at once for managers and should all the while gain by the more prominent variety and richness of the data and information accessible, and investigate approaches to guarantee more noteworthy flexibility with quicker experimentation with the contributions (products or services) and improved consistency of the predictability of new products and services. Firms need to envision the firm development and ensure that its utilization of BI matches its prerequisites i.e., firm strategy. In addition, the bits of knowledge given by BI ought to be made accessible to everybody engaged with the detailed description, alongside a nitty gritty depiction of the significance to make the interaction more versatile and simple to utilize.

CONCLUSION

The result of this study is quite important for both academia and industry. This research provides a clearer insight into the role of BI in forming organizational capabilities and gaining competitive advantages. In addition, this study shows how BI benefits the banking industry by enhancing decisions making and efficiency. The study provides companies with useful knowledge and a broad image of the influence of BI on organizational ability and achievement. The researcher made several recommendations in the light of the previous results of the report, as follows: to continue paying attention to business intelligence and its capabilities because of its relevance to the success of business and organizational capabilities. Hence, we can say the study establishes the importance of IT investment particularly Business Intelligence for better firm performance and decision making; while considering firm strategy as an important element in making the firm deploy technology in the firm.

Besides from the major contribution; the current study also provides opportunities for future researchers. Firstly data was collected from banks located in Islamabad and Rawalpindi; therefore in the future responses from major cities of Pakistan and from different sectors (manufacturing, service) should be collected; to get a broader view, better insights, and generalized results. Secondly: although time-lagged was conducted to control common method biases, self-reported and subjective data is no doubt a major source of CMB and should be controlled. Thirdly: future studies can use governance and firm IT capabilities as an antecedent to technology adoption that may further lead to firm-level outcomes.

REFERENCES

- Ahmad, S., Miskon, S., Alabdan, R., & Tlili, I. (2020). Towards sustainable textile and apparel industry: Exploring the role of business intelligence systems in the era of industry 4.0. *Sustainability*, 12(7), 2632. <https://doi.org/10.3390/su12072632>
- Anderson, J. C., & Gerbing, D. W. (1988). Structural equation modeling in practice: A review and recommended two-step approach. *Psychological bulletin*, 103(3), 411.
- Ashrafi, A., & Ravasan, A. Z. (2018). How market orientation contributes to innovation and market performance: the roles of business analytics and flexible IT infrastructure. *Journal of Business & Industrial Marketing*.
- Avgerou, C., & McGrath, K. (2007). Power, rationality, and the art of living through socio-technical change. *MIS quarterly*, 295-315. <https://doi.org/10.1108/JBIM-05-2017-0109>.
- Balachandran, B. M., & Prasad, S. (2017). Challenges and benefits of deploying big data analytics in the cloud for business intelligence. *Procedia Computer Science*, 112-1122 <https://doi.org/10.1016/j.procs.2017.08.138>.
- Chen, D. Q., Mockler, M., Preston, D. S., & Teubner, A. (2010). Information systems strategy: reconceptualization, measurement, and implications. *MIS quarterly*, 233-259. <https://doi.org/10.2307/20721426>
- Clark Jr, T. D., Jones, M. C., & Armstrong, C. P. (2007). The dynamic structure of management support systems: theory development, research focus, and direction. *MIS Quarterly*, 579-615. <https://doi.org/10.2307/20721426>.
- Davenport, T.H (2010). BI and Organizational Decisions. *International Journal of Business Intelligence Research*, 1(1), 1–12. 22. <https://doi.org/10.1108/BIJ-08-2012-0050>
- Fink, L., Yorgev, N., & Even, A. (2017). Business intelligence and organizational learning: An empirical investigation of value creation processes. *Information & Management*, 54(1), 38-56. <https://doi.org/10.1016/j.im.2016.03.009>.
- Foley, É, & Guillemette, M. G. (2010). What is business intelligence?. *International Journal of Business Intelligence Research (IJBIR)*, 1(4), 1-28. <https://doi.org/10.4018/jbir.2010100101>.
- Gold, A. H., Malhotra, A., & Segars, A. H. (2001). Knowledge management: An organizational capabilities perspective. *Journal of management information systems*, 18(1), 185-214. <https://doi.org/10.1080/07421222.2001.11045669>
- Hayes, A. F. (2017). Introduction to mediation, moderation, and conditional process analysis: A regression-based approach. Guilford publications. <https://www.jstor.org/stable/24018134>
- Henschen, D. (2010). Cover Story: Big Data. *Information Week The business value of technology*. Retrieved from http://library.ltu.edu.tw/download/periodical/20110117_InformationWeek.pdf
- Hwang, H. J., & Seruga, J. (2011). An intelligent supply chain management system to enhance collaboration in textile industry. *International Journal of u-and e-Service, Science and Technology*, 47-61. <https://doi.org/10.5220/0006629304970506>

- Işık, Ö, Jones, M. C., & Sidorova, A. (2013). Business intelligence success: The roles of BI capabilities and decision environments. *Information & management*, 50(1), 13-23. <https://doi.org/10.1016/j.im.2012.12.001>
- Kunle, A. L. P., Akanbi, A. M., & Ismail, T. A. (2017). The influence of marketing intelligence on business competitive advantage (A study of diamond bank Plc). *Journal of Competitiveness*, 9(1). <https://doi.org/10.7441/joc.2017.01.04>.
- Loshin, D. (2012). *Business intelligence: the savvy manager's guide*. Newnes.
- Mashingaidze, K., & Backhouse, J. (2017). The relationships between definitions of big data, business intelligence and business analytics: a literature review. *International Journal of Business Information Systems*, 26(4), 488-505. <https://doi.org/10.1504/IJBIS.2017.087749>
- Nithya, N., & Kiruthika, R. (2021). Impact of Business Intelligence Adoption on performance of banks: a conceptual framework. *Journal of Ambient Intelligence and Humanized Computing*, 12(2), 3139-3150. <https://doi.org/10.1007/s12652-020-02473-2>
- Oliveira, T., & Martins, M. F. (2010, September). Information technology adoption models at firm level: review of literature. In *The European Conference on Information Systems Management* (p. 312). Academic Conferences International Limited.
- Olszak, C. M., & Ziemba, E. (2007). Approach to building and implementing business intelligence systems. *Interdisciplinary Journal of Information, Knowledge, and Management*, 2(1), 135-148. <https://doi.org/10.1002/isaf.307>
- Ramanathan, R., Philpott, E., Duan, Y., & Cao, G. (2017). Adoption of business analytics and impact on performance: a qualitative study in retail. *Production Planning & Control*, 28(11-12), 985-998. <https://doi.org/10.1080/09537287.2017.1336800>
- Richards, G., Yeoh, W., Chong, A. Y. L., & Popović, A. (2019). Business intelligence effectiveness and corporate performance management: an empirical analysis. *Journal of Computer Information Systems*, 59(2), 188-196. <https://doi.org/10.1080/08874417.2017.1334244>
- Sivarajah, U., Kamal, M. M., Irani, Z., & Weerakkody, V. (2017). Critical analysis of Big Data challenges and analytical methods. *Journal of Business Research*, 70, 263-286. <https://doi.org/10.1016/j.jbusres.2016.08.001>
- Suoniemi, S., Meyer-Waarden, L., Munzel, A., Zablah, A. R., & Straub, D. (2020). Big data and firm performance: The roles of market-directed capabilities and business strategy. *Information & Management*, 57(7), 103365. <https://doi.org/10.1016/j.im.2020.103365>
- Tippins, M. J., & Sohi, R. S. (2003). IT competency and firm performance: is organizational learning a missing link? *Strategic management journal*, 24(8), 745-761. <https://doi.org/10.1002/smj.337>
- Trieu, V. H. (2017). Getting value from Business Intelligence systems: A review and research agenda. *Decision Support Systems*, 93, 111-124. <https://doi.org/10.1016/j.dss.2016.09.019>
- Ubiparipović, B., & Đurković, E. (2011). Application of business intelligence in the banking industry. *Management Information System*, 6(4), 23-30.
- Viaene, S., De Hertogh, S., Lutin, L., Maandag, A., Den Hengst, S., & Doleman, R. (2009). Intelligence-led policing at the Amsterdam-Amstelland Police Department: operationalized business intelligence with an enterprise ambition. *Intelligent Systems in Accounting, Finance & Management: International Journal*, 16(4), 279-292. <https://doi.org/10.1002/isaf.306>
- Wanda, P., & Stian, S. (2015). *The Secret of my Success: An exploratory study of Business*

- Intelligence management in the Norwegian Industry. *Procedia Computer Science*, 64, 240-247. <https://doi.org/10.1016/j.procs.2015.08.486>
- Wang, X., & Dass, M. (2017). Building innovation capability: The role of top management innovativeness and relative-exploration orientation. *Journal of Business Research*, 76, 127-135. <https://doi.org/10.1016/j.jbusres.2017.03.019>
- Wheelen, T. L., Hunger, J. D., Hoffman, A. N., & Bamford, C. E. (2017). *Strategic management and business policy* (p. 55). Boston, MA: Pearson.
- Wieder, B., Ossimitz, M., & Chamoni, P. (2012). The impact of business intelligence tools on performance: a user satisfaction paradox?. *International Journal of Economic Sciences and Applied Research*, 5(3), 7-32.
- Wixom, B. H., & Watson, H. J. (2001). An empirical investigation of the factors affecting data warehousing success. *MIS quarterly*, 17-41. <https://doi.org/10.2307/3250957>

